WHAT IS CLAIMED

1.   A method for processing an optical communication signal that has been transported over a dispersive optical communication channel, so as to recover an unknown information signal contained in said

5   optical communication signal, comprising the steps of:

(a) converting said optical communication signal into an electrical communication signal; and

(b) filtering said electrical communication signal by means of an adaptive infinite impulse

10   response (IIR) filter to produce a channel distortion-compensated output signal.

2.   The method according to claim 1, wherein filtering said electrical communication signal includes updating weighting coefficients of said adaptive IIR filter by processing said channel distortion-

5   compensated output signal and at least one of

- the output of a decision operator to which said channel distortion-compensated output signal is coupled, said decision operator being operative to produce an output data stream in accordance with

10   prescribed decision criteria applied to said channel distortion-compensated output signal,

- an undistorted version of a known signal pattern contained in said optical communication signal,

- prescribed statistics or other quantities of one or more system signals.

15   or more system signals.

3.   The method according to claim 2, wherein step (b) comprises updating weighting coefficients of said adaptive IIR filter by processing said channel distortion-compensated output signal and the output of

5   said decision operator.

4.   The method according to claim 3, wherein step (b) comprises generating weighting coefficients of said adaptive IIR filter by differentially combining said channel distortion-compensated output signal and the

5   output of said decision operator to produce an error signal and coupling said error signal to a coefficient generator for said adaptive IIR filter.

5.   The method according to claim 2, wherein step (b) comprises updating weighting coefficients of said adaptive IIR filter by processing said channel distortion-compensated output signal and an undistorted

5   version of a known signal pattern contained in said optical communication signal.

6.   The method according to claim 5, wherein step (b) comprises updating weighting coefficients of said adaptive IIR filter by differentially combining channel distortion-compensated output signal and an undistorted

5   version of a known signal pattern contained in said optical communication signal to produce an error signal and coupling said error signal to a coefficient generator for said adaptive IIR filter.

7. The method according to claim 2, wherein said known signal pattern comprises a signal pattern exclusive of a training signal pattern.

8. The method according to claim 7, wherein said known signal pattern comprises a frame synchronization pattern.

9. The method according to claim 2, wherein step (b) comprises subjecting said channel distortion-compensated output signal and said at least one of the output of said decision operator and said undistorted

5   version of a known signal pattern contained in said optical communication signal to a prescribed synthesis operator to produce synthesized versions thereof, and processing said synthesized versions to update weighting coefficients of said adaptive IIR filter.

10. The method according to claim 1, wherein step (b) includes updating weighting coefficients of said adaptive IIR filter by processing said channel distortion-compensated output signal and multiple ones

5   of
- the output of a decision operator to which said channel distortion-compensated output signal is coupled, said decision operator being operative to produce an output data stream in accordance with

10   prescribed decision criteria applied to said channel distortion-compensated output signal,

- an undistorted version of a known signal pattern contained in said optical communication signal, and

- prescribed statistics or other quantities of one

15 or more system signals.

11. The method according to Claim 2, wherein step (b) comprises updating weighting coefficients of said adaptive IIR filter in accordance with said prescribed statistics or other quantities of one or more system

5 signals.

12. The method according to Claim 11, wherein step (b) comprises updating weighting coefficients of said adaptive IIR filter in accordance with prescribed statistics or other quantities of said electrical

5 communication signal.

13. A receiver apparatus for processing an optical communication signal that has been transported over a dispersive optical communication channel, and recovering therefrom an unknown information signal

5 contained in said optical communication signal, said receiver apparatus comprising:

an opto-electronic converter that is operative to convert said optical communication signal is into an electrical communication signal;

10 an adaptive infinite impulse response (IIR) filter coupled to filter said electrical communication signal

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and producing a channel distortion-compensated output signal; and

a coefficient update mechanism, which is operative
15   to update weighting coefficients of said adaptive IIR filter.

14.   The receiver apparatus according to claim 13, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter in accordance with at least one of:
5   - the output of a decision operator to which said channel distortion-compensated output signal is coupled, said decision operator being operative to produce an output data stream in accordance with prescribed decision criteria applied to said channel
10   distortion-compensated output signal,

- an undistorted version of a known signal pattern contained in said optical communication signal, and

- prescribed statistics or other quantities of one or more system signals.

15.   The receiver apparatus according to claim 14, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter   by   processing   said   channel   distortion-
5   compensated   output   signal   and   the   output   of   said decision operator.

16. The receiver apparatus according to claim 15, wherein coefficient update mechanism is operative to generate weighting coefficients of said adaptive IIR filter by differentially combining said channel 5 distortion-compensated output signal and the output of said decision operator to produce an error signal and coupling said error signal to a coefficient generator for said adaptive IIR filter.

17. The receiver apparatus according to claim 14, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter by processing said channel distortion-5 compensated output signal and an undistorted version of a known signal pattern contained in said optical communication signal.

18. The receiver apparatus according to claim 17, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter by differentially combining channel distortion-5 compensated output signal and an undistorted version of a known signal pattern contained in said optical communication signal to produce an error signal and coupling said error signal to a coefficient generator for said adaptive IIR filter.

19. The receiver apparatus according to claim 14, wherein said known signal pattern comprises a signal pattern exclusive of a training signal pattern.

20. The receiver apparatus according to claim 19, wherein said known signal pattern comprises a frame synchronization pattern.

21. The receiver apparatus according to Claim 14, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter in accordance with said prescribed statistics or
5   other quantities of one or more system signals.

22. The receiver apparatus according to Claim 21, wherein said coefficient update mechanism is operative to update weighting coefficients of said adaptive IIR filter in accordance with prescribed statistics or other
5   quantities of said electrical communication signal.

23. A receiver apparatus for processing an optical communication signal that has been transported over a dispersive optical communication channel, and recovering therefrom an unknown information signal
5   contained in said optical communication signal, said receiver apparatus comprising:

an opto-electronic converter that is operative to convert said optical communication signal is into an electrical communication signal;

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10   an adaptive filter coupled to filter said
electrical communication signal and producing a channel
distortion-compensated output signal; and

      a filter coefficient update mechanism, exclusive
of said adaptive filter, and being operative to
15   adaptively update weighting coefficients of said
adaptive filter.

      24. The receiver apparatus according to claim 23,
wherein said filter update mechanism is operative to
update weighting coefficients of said adaptive filter
in accordance with at least one of:

5   - the output of a decision operator to which said
channel distortion-compensated output signal is
coupled, said decision operator being operative to
produce an output data stream in accordance with
prescribed decision criteria applied to said channel
10   distortion-compensated output signal,

      - an undistorted version of a known signal pattern
contained in said optical communication signal and
exclusive of a training signal, and

      - prescribed statistics or other quantities of one
15   or more system signals.

      25. The receiver apparatus according to claim 24,
wherein said filter coefficient update mechanism is
operative to subject said channel distortion-
compensated output signal and said at least one of the
5   output of said decision operator and said undistorted

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version of a known signal pattern contained in said optical communication signal to a prescribed synthesis operator to produce synthesized versions thereof, and to process said synthesized versions to update

10 weighting coefficients of said adaptive filter.

26. The receiver apparatus according to Claim 24, wherein said filter update mechanism is operative to update weighting coefficients of said adaptive filter in accordance with said prescribed statistics or other

5 quantities of one or more system signals.

27. The receiver apparatus according to Claim 26, wherein said filter update mechanism is operative to update weighting coefficients of said adaptive filter in accordance with prescribed statistics or other

5 quantities of said electrical communication signal.